BIAMP®

Vocia®

VA-8600/VA-8600c

Manual

January 2012

IMPORTANT SAFETY INSTRUCTIONS

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this product near water.

6) Clean only with dry cloth.

7) Do not block ventilation openings. Install in accordance with the manufacturer's instructions.

8) Do not install near any heat sources such as radiators, heat registers, stoves, or other product (including amplifiers) that produce heat.

9) Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong.

The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the product.

11) Only use attachments/accessories specified by the manufacturer.

12) Use only with equipment rack, cart, stand or table designed to provide adequate mechanical strength, heat dissipation and securement to the building structure.

When a cart is used, use caution when moving the cart and product combination to avoid injury from tip-over.

13) Unplug this product during lightning storms or when unused for long periods of time.

14) Refer all servicing to qualified service personnel. Servicing is required when the product has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the product, the product has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING - To reduce the risk of fire or electric shock, do not expose this product to rain or moisture.

WARNING - This product employs Safety Grounding and must be connected to a MAINS socket that is properly grounded to provide a protective earthing connection.

Disconnect Device - The MAINS plug is used to disconnect MAINS power and must be installed near the equipment and remain readily accessible.

Explanation of safety related symbols - Product labeling and the operation manual may use the internationally recognized symbols defined below to note safety messages.

Lightning Bolt: Hazardous Live voltages present when this unit is in operation. Do not touch terminals marked with this symbol while the unit is connected to live power.

Exclamation Point: Replace components (i.e. fuses) only with the values specified by the manufacturer. Failure to do so will compromise safe operation of this unit.

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The VA-8600 and VA-8600c are digital networked multi-channel amplifiers. Both the VA-8600 and the VA-8600c are CobraNet® enabled and feature eight channels of modular amplification, and DSP with optional channel-to-channel or device-to-device failover. The VA-8600c is designed to be used specifically with EN 54-16 certified systems, with the AM-600c card. It can support up to eight amplifier cards that are individually software configurable from 100–600 Watts for up to 2400 Watts of power per chassis, with software-selectable 70V, 100V, and low-impedance outputs per card. The on-board DSP provides comprehensive fixed-chain digital signal processing within the device, including volume control, ducking, equalization, compressor/limiter, speaker crossover, delay, and output gain. Emergency messages for life-safety compliant systems are stored in non-volatile memory within the VA-8600 and VA-8600c. Intuitive software provides audio system design via PC computer. Two RJ45 connectors on the rear panel of the VA-8600 and VA-8600c provide redundant connectivity to control data and audio over a single Ethernet cable.

FEATURES

- Modular based design
- Amplification modules have software configurable power levels/load options
  - 8 amplification modules per frame with 100W to 600 Watts per module (maximum of 2400W per chassis)
  - 70 V or 100 V with direct drive capability, or low-impedance (4 or 8Ω) operation
  - Maximum of 2400 watts of power in 3 rack unit device
- Failover capability between channels and amplifiers
- Local non-volatile storage of emergency messages
- LED Indication:
  - Amplifier failure
  - Clip present
  - Fan stuck-rotor
  - Heat sink temperature fault
  - Signal Peak
  - Signal present
- Software Monitoring Features:
  - Amplifier failure
  - Excessive clipping
  - Fan stuck rotor
  - Heat sink temperature fault
  - Peak present
  - Short circuit on output
- Software-configurable signal processing including volume control, filters, compressor/limiting, delay, speaker equalization, and output sensitivity
- CobraNet audio/control with dynamic use of available bundles over single Ethernet cable
- Dual CobraNet ports for redundancy
- Heavy duty removable terminal block connectors for speaker line connections
- Rotary switches for unit identification
- **CE** marked, **UL** listed and **RoHS** compliant
- Covered by Biamp Systems' warranty

Setup and Use

The Vocia software provides the interface for configuring and programming the VA-8600 and VA-8600c. The information supplied by this manual relates to hardware installation, physical connections, and device and channel failover concerns. For more details on software setup, please consult the Vocia Software Help File.

Figure 1. Front Panel

System Indicators

The LED indicators on the front panel provide information about the function and operational status of the VA-8600 and VA-8600c chassis and any installed AM-600 or AM-600c amplifier modules. Columns one through eight correspond to the eight amplifier module slots. The remaining LEDs correspond to the VA-8600 and VA-8600c chassis.

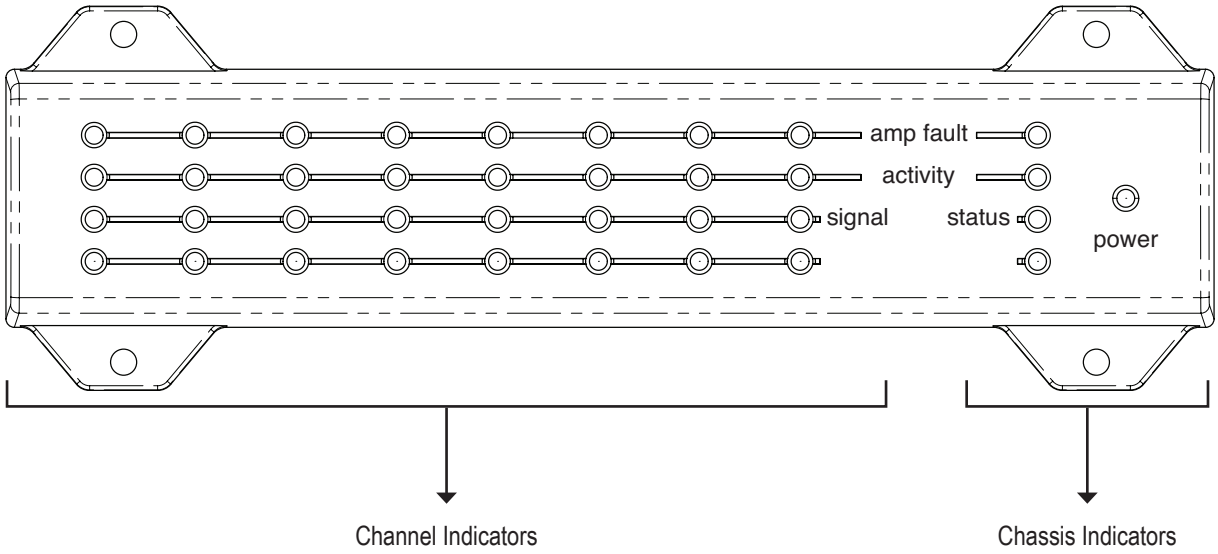


Figure 2. System Indicators

Channel Indicators

Amp Fault is a yellow LED that illuminates when a channel fault has occurred. Two types of channel faults can be reported, depending on the severity of the problem. Flashing yellow indicates a Warning, which means that some aspect of the AM-600 or AM-600c amplifier module is not performing within normal specification. Audio may still be passing, but if the condition causing the Warning is not corrected, channel failure may occur. Solid yellow indicates a fault, which means that some aspect of the AM-600 or AM-600c amplifier module has failed and audio is no longer passing on that channel. Use Vocia software to determine the specific type of channel warning or fault that has occurred.

Activity is a two-color LED that illuminates in green when that channel is configured and actively passing audio and yellow when that channel is configured and in standby. Standby only occurs when a channel has been designated as redundant channel in a configuration where failover is enabled.

Signal is a tri-color LED that indicates audio signal presence on the channel. Green indicates that the audio signal level is between -50 dBFS and -3 dBFS, yellow indicates a signal level between -3 dBFS and 0 dBFS, and red indicates clipping.

Chassis Indicators

Amp Fault is a yellow LED that illuminates when a chassis fault has occurred. There are two types of chassis faults that can be reported, depending on the severity of the problem. Flashing yellow indicates a Warning, which means that some aspect of the VA-8600 or VA-8600c chassis is not performing within normal specification. Audio may still be passing, but if the condition causing the Warning is not corrected, chassis failure may occur. Solid yellow indicates a fault, which means that some aspect of the VA-8600 or VA-8600c chassis has failed and audio may no longer be passing through the device. Use Vocia software to determine the specific type of chassis warning or fault that has occurred.

Activity is a tri-color LED that illuminates to show the configuration status of the VA-8600 and VA-8600c unit. If the LED is dark, there is no configuration in the unit. A green LED indicates that the unit is configured and a yellow LED indicates that the unit is configured and in standby. Standby only occurs when a unit has been designated as a redundant device in a configuration where failover is enabled. A red LED indicates a configuration load failure.

Status is a tri-color LED that indicates the health of the VA-8600 and VA-8600c hardware. A green LED indicates that the unit powered up normally. A flashing yellow LED is shown briefly during the power-up self test and should turn solid green upon successful start. A red LED indicates that the unit experienced a problem during the power-on self test.

Power is a green LED that illuminates when power is applied to the unit.

Table 1. Channel Indicators

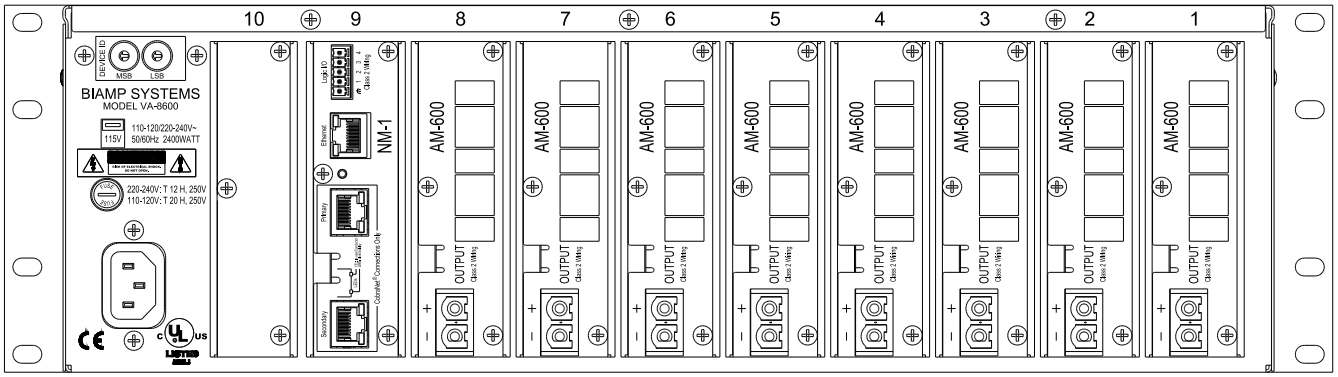
LED Row	Label	Red	Yellow	Green	Dark
1	AMP FAULT	Never	Flashing-Warning Solid-Fault	Never	No Amp Faults
2	ACTIVITY	Never	Configured and in standby[1]	Configured and active	Not configured
3	SIGNAL	Signal above clip threshold (>= 0dBFS)	Signal above peak but below clip threshold (> -3dBFS & < 0dBFS)	Signal above min. but below peak threshold (> -50dBFS & < -3dBFS)	Signal below min. threshold (< -50dBFS)
4	—	—	—	—	—

Table 2. Chassis Indicators

LED Row	Label	Red	Yellow	Green	Dark
1	AMP FAULT	Never	Flashing-Warning Solid-Fault	Never	No Amp Faults
2	ACTIVITY	Configuration load failure	Configured and in standby[2]	Configured and active	Not configured
3	STATUS	POST Failure	Booting (flashing)	Boot succeeded	Did not boot
4	—	—	—	—	—

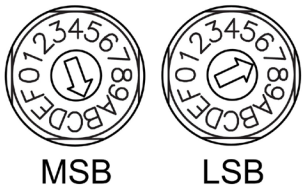
1. Only applicable on amplifier modules configured for redundancy operation
2. Only applicable on amplifier modules configured for redundancy operation

Figure 3. Rear Panel Layout



Device ID Switches

The rotary ID switches are located on the back of the VA-8600 and VA-8600c and give the unit a unique Device ID. The switches are in hexadecimal format. All VA-8600 and VA-8600c units must have a unique Device ID to function properly within a Vocia Paging World (i.e., it is not possible to have two VA-8600 and VA-8600c units with the same Device ID of hex 07). To assign a Device ID of hex 07, turn the LSB switch to 7 and leave the MSB switch on 0. To create an ID of hex B7, turn the LSB switch to 7 and turn the MSB switch to B. Device ID switches should be set using a 0.1 inch (2.5mm) to 0.12 inch (3.0mm) flat blade screwdriver. More information on setting IDs and the hexadecimal numbering scheme used in Vocia can be found in the Vocia Help File.



Power Entrance

The Power Entrance provides for connection of the appropriate power cord (included with unit). A switch selects the operating voltage for the power supply, 110–120V or 220–240V at 50/60 Hz.

NM-1

NM-1 is the Network Module that is included with VA-8600 and VA-8600c. This module provides connectivity for control and audio via the dual CobraNet interface and logic ports for the device failover functionality. The RJ45 connector labeled "Ethernet" is not used at this time.

Reset Button

Reset button, when held down for 5 seconds, performs a chassis restart. The Status indicator will flash yellow during restart and will turn solid green once the process is complete.

Logic I/O

The Logic I/O connector on the NM-1 facilitates redundant device failover only. It is not a general-purpose contact closure interface. See the Amplifier-to-Amplifier Failover section below.

Network Connection

The VA8600 and VA-8600c are CobraNet devices. All CobraNet routing and bundle assignments are processed by the Vocia devices locally. Vocia makes dynamic use of available bundles in CobraNet. Vocia devices are currently not interoperable with non-Vocia devices. A 10/100Base-T Ethernet switch (not repeater hub) is required when networking multiple units. CobraNet utilizes standard CAT5, CAT5e, CAT6, or CAT7 cabling, which has a specified maximum length of 328 feet (100 meters). Additional Ethernet switches, or switches which provide fiber-optic interface, can be used to extend the physical distance between units within a network. Please note that CobraNet limits network extensions to seven hops (one-way transmissions) within a network.

The primary and secondary CobraNet ports are provided to facilitate connection redundancy. Each connector provides two LEDs that indicate Ethernet link and network activity (see table below).

Table 3. CobraNet interface status LEDs

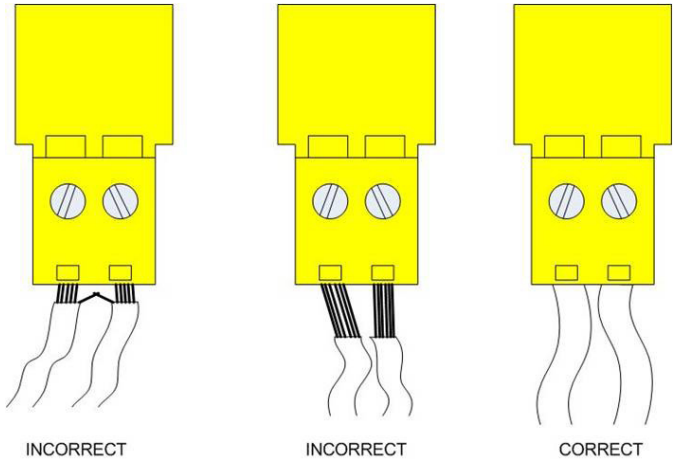
Left LED	Right LED	Description
None	None	No data connectivity.
None	Green	Link established.
Flashing yellow	Green	Link established and CobraNet activity detected; the unit is acting as a CobraNet performer.
Flashing yellow	Flashing green	Link established and CobraNet activity detected; the unit is operating as a CobraNet conductor.
Flashing yellow	None	CobraNet fault. Check cabling and configuration for errors.

AM-600/AM-600c

AM-600 or AM-600c is the Amplifier Module card. A VA-8600 or VA-8600c chassis can be populated with up to eight AM-600 or AM-600c cards. The AM600c reports a fault if it detects a short to ground on a speaker line, where this short would compromise the capability of the amplifier to deliver emergency messages

Output

Use the yellow plug-in barrier strip connectors to connect loudspeaker level outputs. If stranded speaker wire is used, be sure to incorporate all strands into the connector, as stray strands can short to the adjacent terminal or chassis. Do not leave excessive bare wire outside the terminals, as this can lead to shorts.



Please note: The VA-8600 and VA-8600c are powerful amplifiers and can damage loudspeakers. Please treat the VA-8600 and VA-8600c outputs as you would AC mains power outlets. Always check the loudspeaker's continuous and peak power capabilities and match the amplifier settings accordingly.

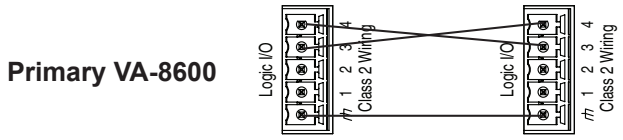
Amplifier-to-Amplifier Failover

Vocia supports one-to-one automatic amplifier failover in case of fault. Failover is triggered by one of the following conditions:

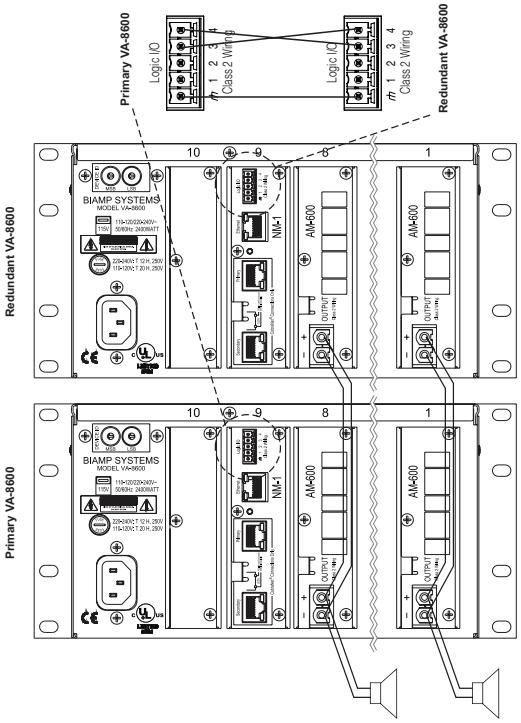
- Chassis fault
- Channel fault
- Loss of power
- Loss of CobraNet link
- Loss of Logic I/O

Only faults (e.g., heat sink fault and channel failure fault) trigger the failover mechanism. Warnings indicate abnormal system conditions that do not immediately impair audio and do not trigger the failover mechanism.

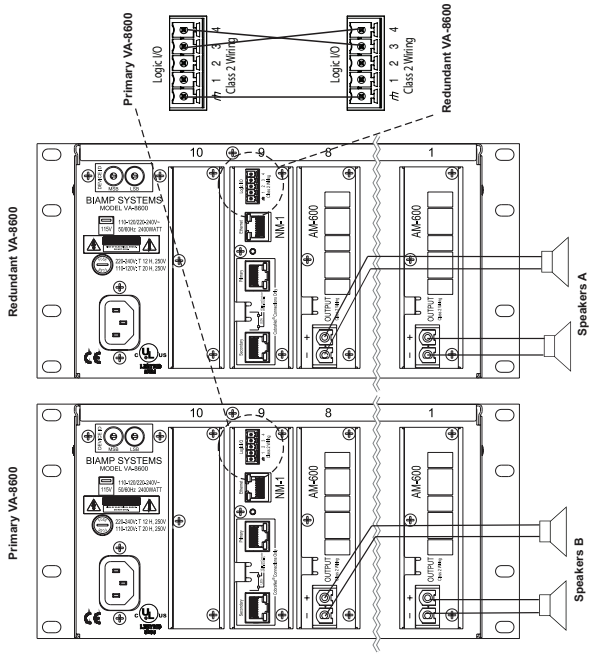
The redundant amplifier must have the same configuration as the primary amplifier (i.e., amplifier module count, watts per module, load configuration). A wire failover link cable must be connected between the primary and the redundant amplifier as shown below. Connect ground to ground and logic 4 of the primary amplifier to logic 3 of the redundant amplifier; connect logic 3 of the primary amplifier to logic 4 of the redundant amplifier. Leave logic 1 and 2 disconnected. The redundant amplifier can be wired in parallel to the existing speaker line or it can be connected to a redundant speaker line (see figure below). Relays isolate the output terminals on the secondary VA-8600 or VA-8600c unit. Relays are normally open. When a configuration is received, relays close on the primary VA-8600 or VA-8600c and remain open on the redundant VA-8600 or VA-8600c. On failover, the relay position is switched.



After replacing the faulty amplifier, a power cycle is required to recover from failover. The primary device will resume control after the fail condition is cleared and the unit is re-powered.



Parallel



Redundant

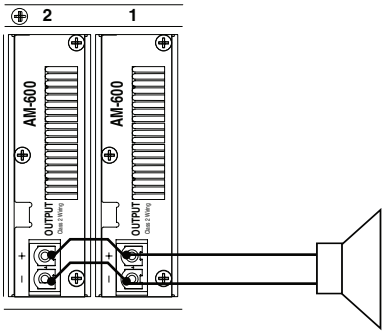
Channel-to-Channel Failover

In addition to entire amplifier failover, Vocia supports channel-to-channel failover, which is triggered by one of the following conditions:

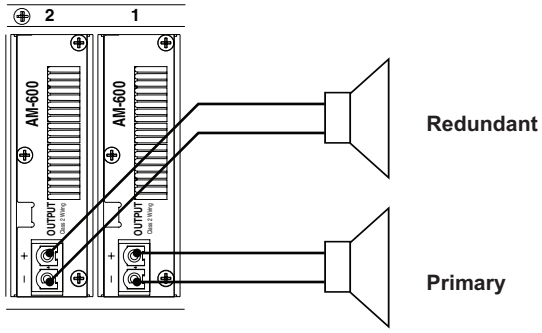
- Heat Sink fault
- Short Circuit fault
- Channel Failure fault

The wire failover link cable is not required when wiring channel-to-channel failover.

Parallel Wiring



Redundant Wiring



The redundant channel can be wired in parallel to the existing speaker line (shown above) or connected to a redundant speaker line. The primary amplifier module will resume control after the fault condition is cleared and the unit is re-powered.

Vocia Amplifier 8600/8600c SPECIFICATIONS

Memory:	5.625 MB
Inputs:	20 bits, 48 kHz, 5-1/3 ms (fixed)
Connection:	RJ45 with shielded Ethernet/PoE cable (CAT5, CAT5e, CAT6, or CAT7)
Total Output Power:	2400W maximum per chassis (Burst Mode only. Protective thermal limiting will reduce long-term power output
Environment	
Ambient Operating Temperature Range:	18-107 degrees F (-8 – 42° C)
Ambient intake humidity:	0 – 100% non-condensing
Altitude:	0 – 10,000 Feet MSL

Power:	110-120 & 220-240VAC 50/60Hz
Overall Dimensions:	
Height:	5.25 inches (133mm)
Width:	19 inches (483mm)
Depth:	17.25 inches (438mm)
Weight:	
Chassis:	50 lbs. (22.68 kg)
AM 600 card:	1.25 lbs. (0.57 kg)
Compliance:	FCC Part 15, class B CE marked EN 54-16 certified (VA-8600c) RoHS Directive UL 60065 Listed, E215636 C-UL Listed, E215636 C-Tick, N24138 (Australia)

AM-600/600c Card SPECIFICATIONS

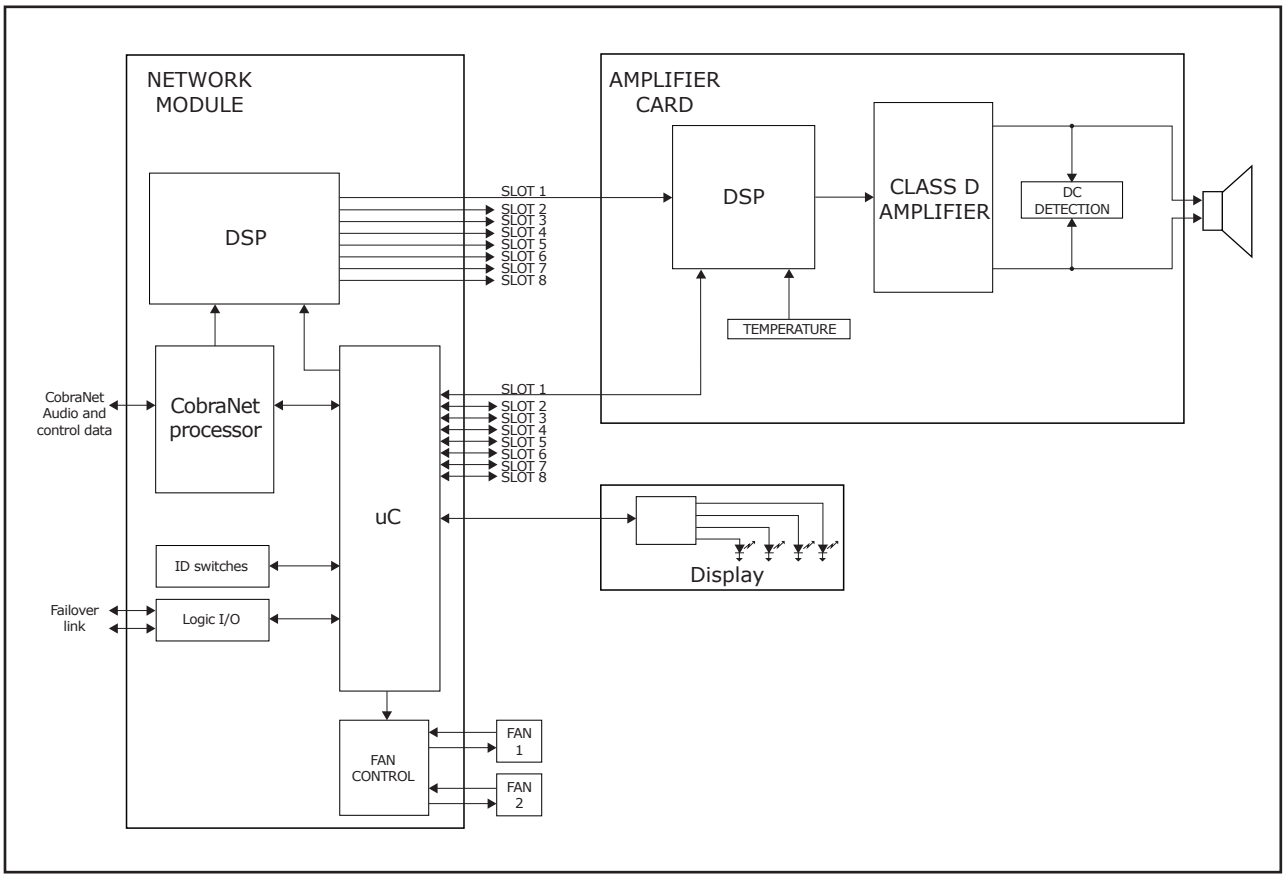
Supported Loads:	4Ω, 6Ω, 8Ω, 70-Volt or 100-Volt Line direct drive
Continuous operation: in chassis with fans running normally and unrestricted intake and exhaust	600 W: 1 kHz continuous sine wave indefinitely

Signal-to-Noise Ratio: (unweighted over 22 Hz – 20 kHz)

	Low-impedance	**70V**	**100V**
100W	>95 dB	>100 dB	>101 dB
200W	>98 dB	>101 dB	>102 dB
300W	>99 dB	>101 dB	>102 dB
400W	>101 dB	>102 dB	>103 dB
500W	>102 dB	>102 dB	>103 dB
600W	>102 dB	>103 dB	>104 dB

Frequency response:	20 Hz – 20 kHz frequency response flat +/-1 dB
Distortion and Noise:	≤0.3% THD+N (20 Hz – 20k Hz) all loads and power levels
Intermodulation distortion (SMPTE):	<0.2%
Inter-channel Isolation:	>75 dB (20 Hz-20 kHz, full power out)
DC offset:	<10mV

Vocia Amplifier 8600/8600c BLOCK DIAGRAM



VA-8600/8600c 115 VAC current draw and heat output

To determine the AC line current draw and heat output for the configuration, start by finding the total power for the configured Vocia chassis. Then refer to the column that describes the type of audio levels the amplifier will be producing. If your configuration uses more amplifier modules than the number shown, add 0.1 amps and 37 BTU for each additional module in the chassis.

		IDLE		1/8 POWER PINK NOISE		1/3 POWER PINK NOISE		FULL POWER SINE WAVE	
Total Output Power (Peak Watts)	**VA-8600 Modules**	**Amps**	**BTU**	**Amps**	**BTU**	**Amps**	**BTU**	**Amps**	**BTU**
No cards	0	0.3	106	NA	NA	NA	NA	NA	NA
100	1	0.4	143	0.7	227	0.9	244	1.6	406
200	1	0.4	143	0.8	239	1.3	271	2.7	491
300	1	0.4	143	1.0	251	1.6	300	3.8	590
400	1	0.4	143	1.1	263	2.0	333	4.9	668
500	1	0.4	143	1.3	278	2.4	356	6.1	788
600	1	0.4	143	1.4	297	2.8	413	7.3	910
700	2	0.5	177	1.8	418	3.4	551	8.9*	1211
800	2	0.5	177	2.0	430	3.8	577	10.0*	1296
900	2	0.5	177	2.1	442	4.2	607	11.1*	1395
1000	2	0.5	177	2.2	454	4.5	640	12.2*	1473
1100	2	0.5	177	2.4	469	4.9	663	13.4*	1592
1200	2	0.5	177	2.5	488	5.3	720	14.5*	1715
1300	3	0.5	211	3.0	609	6.0	858	16.2*	2015
1400	3	0.5	211	3.1	621	6.3	884	17.3*	2101
1500	3	0.5	211	3.2	633	6.7	914	18.4*	2199
1600	3	0.5	211	3.4	644	7.1	947	19.5*	2278
1700	3	0.5	211	3.5	660	7.4	970	20.6*	2397
1800	3	0.5	211	3.7	679	7.8	1026	21.8*	2520
1900	4	0.6	246	4.1	800	8.5	1165	23.4*	2820
2000	4	0.6	246	4.2	812	8.8	1191	24.5*	2905
2100	4	0.6	246	4.4	824	9.2	1221	25.7*	3004
2200	4	0.6	246	4.5	835	9.6	1254	26.7*	3083
2300	4	0.6	246	4.7	851	9.9	1276	27.9*	3202
2400	4	0.6	246	4.8	870	10.4	1333	29.1*	3325

Notes:

For 230 VAC, multiply the current by 0.5.

PN = Pink Noise

For each additional module above 4, add 0.1 A to the current draw and 37 BTU to the heat output.

* Burst mode only. Protective thermal limiting will reduce long-term AC current and continuous power output.

VA-8600/VA-8600c WARRANTY

BIAMP SYSTEMS IS PLEASED TO EXTEND THE FOLLOWING 5-YEAR LIMITED WARRANTY TO THE ORIGINAL PURCHASER OF THE PROFESSIONAL SOUND EQUIPMENT DESCRIBED IN THIS MANUAL

1. BIAMP Systems warrants to the original purchaser of new products that the product will be free from defects in material and workmanship for a period of 5 YEARS from the date of purchase from an authorized BIAMP Systems dealer, subject to the terms and conditions set forth below.

2 If you notify BIAMP during the warranty period that a BIAMP Systems product fails to comply with the warranty, BIAMP Systems will repair or replace, at BIAMP Systems' option, the nonconforming product. As a condition to receiving the benefits of this warranty, you must provide BIAMP Systems with documentation that establishes that you were the original purchaser of the products. Such evidence may consist of your sales receipt from an authorized BIAMP Systems dealer. Transportation and insurance charges to and from the BIAMP Systems factory for warranty service shall be your responsibility.

3. This warranty will be VOID if the serial number has been removed or defaced; or if the product has been altered, subjected to damage, abuse or rental usage, repaired by any person not authorized by BIAMP Systems to make repairs; or installed in any manner that does not comply with BIAMP Systems' recommendations.

4. Electro-mechanical fans, electrolytic capacitors, gooseneck microphones, cords connecting handheld microphones, hard-drives, displays, and normal wear and tear of items such as paint, knobs, handles, keypads and covers are not covered under this warranty. All server-based devices are warranted for 3 years only.

5. This warranty is in lieu of all other warranties, expressed or implied. BIAMP Systems disclaims all other warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose.

6. The remedies set forth herein shall be the purchaser's sole and exclusive remedies with respect to any defective product.

7. No agent, employee, distributor or dealer of BIAMP Systems is authorized to modify this warranty or to make additional warranties on behalf of BIAMP Systems. Statements, representations or warranties made by any dealer do not constitute warranties by BIAMP Systems. BIAMP Systems shall not be responsible or liable for any statement, representation or warranty made by any dealer or other person.

8. No action for breach of this warranty may be commenced more than one year after the expiration of this warranty.

9. BIAMP Systems shall not be liable for special, indirect, incidental, or consequential damages, including lost profits or loss of use arising out of the purchase, sale, or use of the products, even if BIAMP Systems was advised of the possibility of such damages.

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FCC NOTICE - CLASS B DIGITAL DEVICE

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential as well as in a commercial installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1) Reorient or relocate the receiving antenna, 2) Increase the separation between the equipment and receiver, 3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected or 4) Consult the dealer or an experienced radio/TV technician for help.

BIAMP®

DoC VADSP201201

CE

EC Declaration of Conformity

Biamp Systems Corporation, as manufacturer having sole responsibility, hereby declares that the following described product complies with the applicable provisions of the DIRECTIVES below except as noted herein. Any alterations to the product not agreed upon and directed by Biamp Systems Corporation will invalidate this declaration.

Products:	Models:	
Networked Amplified DSP	VA-8600, VA-8600c, Vocia Amplifier 8600, Vocia Amplifier 8600c	
Vocia Amp and I/O Cards	AM-600, AM-600c, PARM, VFOM-1	
Applicable EC Directives:	Applicable Harmonized Standards:	
LVD Directive (2006/95/EC)	Safety	EN 60065:2002
EMC Directive (2004/108/EC)	Emissions	EN 55103-1:1996, Class B, Environment E2
	Immunity	EN 55103-2:1996, Environment E2

Special Considerations for Product Environment or Compliance:

Shielded cabling must be used for system connections.

Technical Documentation File, Location and Contact:

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9300 S.W. Gemini Drive	fax:	(503) 626.0281
Beaverton, OR USA 97008	e-mail:	compliance@biamp.com

Authorized Representative: Larry Copley, Compliance Engineer

Authorized Signature:

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EU RoHS COMPLIANT

This Biamp product, including all attendant cables and accessories supplied by Biamp, meets all requirements of EU Directives 2002/95/EC of January 27, 2003, and 2005/618/EC of August 18, 2005, the EU RoHS Directives. An EU RoHS Materials Content Declaration document may be obtained at www.biamp.com

(This information is presented to comply with the requirements of Chinese law SJ/T11363-2006)"

有害物质表

Biamp Systems Corporation

数字信号处理器与放大器 (Digital Signal Processor and Amplifier)

Vocia VA-8600 and VA-8600c

部件名称	有毒有害物质或元素					
	Pb 铅	Hg 汞	Cd 镉	Cr+6 六价铬	PBB	PBDE
设备机箱 (Equipment Chassis)	X	O	X	O	O	O
电源线 (Power Cord)	O	O	O	O	O	O
插拔式接线端子 (Plug-in Terminal Blocks)	O	O	O	O	O	O
光盘(CD ROM)	O	O	O	O	O	O
手册和其他书面文档 (Manual and Paper Documents)	O	O	O	O	O	O
包装箱和所有包装材料 (Box and Packing Materials)	O	O	O	O	O	O

0：表示该部件所有均质材料中的这种有毒有害物质低于 SJ/T11363-2006 的限制要求.

X：表示该部件中至少有一种均质材料所含的这种有毒有害物质高于 SJ/T11363-2006 的限制要求.

在电触头和（或）镀镉所含的均质材料中，镉及其化合物的含量可以超过 0.01%，但欧盟指令 91/338/EEC（根据欧盟指令 76/769/EEC）限制销售和使用某些危险物质和制剂部分中所禁止的用途除外

在以下一种或多种物质所含的均质材料中，铅及其化合物的含量可以超过 0.1%:

1) 电子元器件中玻璃内所含的铅
2) 铅在钢材中是作为一种合金元素，含量可达 0.35%
3) 铅在铝材中是作为一种合金元素，含量可达 0.4%
4) 铅在铜材中是作为一种合金元素，含量可达 4%
5) 高熔点类焊料中的铅（即铅料合金，铅含量超过 85%）
6) 电子陶瓷部件内的铅
7) 由两种以上元素组成的焊料中所含的铅，用于连接针脚和微处理器包装，其中铅的含量超过 80% 但低于 85%
8) 顺应针连接系统内的铅
9) 倒装芯片封装中半导体芯片及载体之间形成可靠连接所用焊料中的

在正常使用情况下，中国环保使用期限为 10 年，条件是：

- 环境温度为 0-40C (32-104°F)
- 湿度为 0-95%，无凝结
- 海拔高度为 0-10,000 英尺
- 气流不受阻碍
- 没有水或其他液体进入任何部件
- 电源为 110-120/220-240 Vac, 50/60 Hz, 8/4 A
- 部件没有损坏（损坏部件应立即修理）
- 由工厂授权人员使用批准的材料进行所有维修